

ments to be made by the staff of the Plymouth Laboratory on these practical questions.

A few misprints (none of great moment) have been noticed in reading over the book, viz. "ectetmoid" (p. 53), "an" for on (p. 61), "Kupher's" vesicle (p. 120), and Fig. 3 for Fig. 5 (p. 123, foot); while a slip occurs near the foot of p. 50 in the phrase "those of the dorsal or right eye," since the dorsal eye in the sole is the left.

The book, as a whole, is good, and forms an interesting and important contribution to our slender list of monographs of British animals, and on account of its economic side will, no doubt, interest a wider circle of readers than is usually the case with zoological works. The Marine Biological Association are to be congratulated on the appearance of their first memoir, and it is hoped that others of the series will speedily follow.

W. A. HERDMAN.

WOOD-WORKING.

Exercises in Wood-working, with a Short Treatise on Wood, written for Manual Training Classes in Schools and Colleges. By Ivin Sickels, M.S., M.D. (New York: D. Appleton and Company. London: W. Allen and Co., 1890.)

THIS is, in some respects, a more interesting work than its title would seem to indicate. Of late years, since it has been recognized that manual or practically industrial training of some kind should form a part of the education of every child, books of this kind have greatly improved in every respect, because it has become more necessary to make them thorough in details, and at the same time present them in such clear and succinct language that they may be perfectly intelligible to youthful minds. And as the interest in the subject of technical education is rapidly increasing, and with it the demand for good manuals, it is not without pleasure that we welcome a work which fulfils admirably what is requisite for its purpose. The author, in an introduction which we could wish had been longer, remarks that the tendency of modern systems of education is towards a proper distribution of practical with theoretical training—that is, manual with "literary" education—and that the *mind* is to be aided in its development by the action of the eye and hand. "The prime object of all manual training is to aid mental development." This is a very great and little-known truth, which was first fully set forth in a work entitled "Practical Education," by C. G. Leland, in which it was shown that, out of 110,000 children in the public schools of Philadelphia, the 200 who attended industrial art classes, and who were chosen at random for them, were the first in *all* studies, such as arithmetic or geography; that is to say, it has been proved by years of careful experiment on a very large scale, that if we take two children of equal capacity, following the same studies in the same school, and let one of these have at the same time from two to four hours' weekly training in design, modelling, wood-carving, and carpenters' work, &c., the latter will invariably take precedence in all the ordinary school studies, so much is the mind impressed by industrial art culture. The recog-

nition of this principle by a practical teacher like Dr. Sickels indicates that his work is written in accordance with the most advanced ideas on the subject of technical education.

The author begins by giving in Part I. a sufficiently detailed description of the structure of wood of different kinds, its composition and manner of growth, the season for cutting trees, drying of wood, and warping, its properties, measure, and value, with an account of the twenty-five kinds most generally used. In describing wood-working trades, he declares there are only two, carpentry and joinery, carving and turning being only "adjuncts" to joinery; a degradation of wood-carving with which we should suppose few would agree. It is difficult for us, with a magnificent fourteenth century carved wood image of the Virgin and Child before us as we write, to comprehend what it has in common with "joinery," while, as regards turnery, the great and admirable work of John J. Holtzapfel, certainly establishes its claim to be an independent art. "But these be trifles." The principal part of the work, or about one hundred pages, which is copiously illustrated with pictures which are all intelligible at a glance (not an *invariable* thing in such works), is, on the whole, without errors. It treats of carpenters' tools (those for wood-carving are not included, but should have been) and their use in detail, this portion being admirably executed; the construction of joints, which is, on the whole, the most difficult and interesting part of the wood-worker's art, being very well written. The student who wishes, however, to be perfect in this, should also consult "Forty Lessons in Carpentry Practice," by C. F. Mitchell (London: Cassell and Co.), a little book of great value. The mysteries of the mitre joint, stretchers, dowels, and dovetailing, have, however, never been treated more cleverly or clearly than by Dr. Sickels. Among remaining topics are drawers, framing—of which we have by no means enough, though "good, what there is of it"—laying floors, trimming, and the construction of all the minor details, such as doors, stairs, sashes, and hand-rails. This portion of the work would be of great practical value to settlers in the wilderness, who would often like to build for themselves houses, yet know not how. We believe that the world, however, still lacks a work teaching men all the art of making shelters and homes, from building wigwams or adjusting stones and boughs for a night's lodging, up to log huts, Pictish "bee-hives," box cottages, "and so wider." As regards typographical details, paper, and binding, this work is all that could be expected.

BACTERIA.

Les Bactéries et leur rôle dans l'Étiologie, l'Anatomie, et l'Histologie pathologiques des Maladies Infectieuses. Par A. V. Cornil et V. Babes. Third Edition, in Two Volumes. (Paris: Félix Alcan, 1890.)

THIS enlarged edition treats of the whole range of pathogenic and to a certain extent also of non-pathogenic bacteria in a fairly exhaustive manner. The classification, the chemical nature, the biological characters, the methods used in their study, both in cultures

and in staining them in animal tissues, are described in a lucid though rather a dogmatic fashion. The rôle and the nature of the rôle the pathogenic bacteria play in relation to infectious diseases are, as the title indicates, the principal subjects of the book, and we have no hesitation in saying that the authors have produced a very creditable work. But there are a number of diseases of the lower animals described here, in which the demonstration of bacteria in microscopic sections through one or the other of the diseased organs is sufficient for the authors to assign to those bacteria a specific character; more than this, every granule which appears stained in those sections is regarded by the authors as a microbe. The exact proof, and even attempt at exact proof, that this is so is omitted in many of these cases.

The illustrations accompanying the text are very numerous, many of them in colours: amongst these latter some are very excellent and true to nature, *e.g.* those illustrating the chapter on tuberculosis; many others are decidedly bad and erroneous, *e.g.* most of the illustrations of cultivations, and some of the sections stained in one or two colours, while many others are badly printed. We fail to see the use of such a confusing and diagrammatic crowd of illustrations as form plate i. The authors give numerous references to other workers, but there is, we think, a rather large dose of reference to their own works, such reference occurring in remarkable sameness. In several instances they do not seem to have read the original statements of their references. Thus, for instance, Cornil and Chantemesse in 1887 described and illustrated the pathology of the disease known in England as swine fever; they describe it under the name of "pneumo-entérite des porcs," both the name and the pathology of which disease have been minutely described and copiously illustrated in the Reports of the Medical Office of the Local Government Board for 1878-79, under the name of "infectious pneumo-enteritis of the pig." If they had really read the text in that English Blue-book, and inspected the illustrations of the pathology of our infectious pneumo-enteritis of the pig, they could not have failed to see that they are using the same name for the same disease, *viz.* they would have recognized the identity of the English and French disease; as a matter of fact, they give us erroneously to understand that our infectious pneumo-enteritis is the French "rouget de porcs," a disease utterly different from it.

There are various assumptions as regards the biology of certain specific bacteria, for which not even an attempt at proof is undertaken. Thus the authors ascribe to the bacillus of diphtheria and the bacillus of typhoid fever the power to form spores, and this deduction they make from certain differentiated granules in the bacilli brought out by staining; but every bacteriologist knows very well that such proof is valueless, unless the alleged spores have been observed to be able to germinate; and unless certain experimental evidence (drying, heating, action of antiseptics) is forthcoming, no one would be justified in concluding that those granules in bacilli are spores.

Though the work, as has been remarked, is not all that could be wished, it nevertheless deserves to take a high place amongst the text-books on bacteriology. It is written in a very lucid style, and abounds in valuable and original observations.

OUR BOOK SHELF.

Verslag omtrent den Staat van 'S Lands Plantentuin te Buitenzorg en de daarbij behoorende Inrichtingen over het Jaar 1889 ("Report on the Condition of the State Gardens at Buitenzorg"). (Batavia: Government Printing Office, 1890.)

UNDER the able direction of Dr. Treub, the author of the Report before us, the botanic garden at Buitenzorg in Java has developed into one of the most important establishments of the kind in existence, and has become an active centre of both scientific and practical botany. The present Report renders an account of the staff, publications, library, herbarium, museum, botanical laboratory, chemical-pharmacological laboratory, botanical garden, experimental garden for trials of trees producing gutta-percha, together with copious lists of plants and seeds distributed and received. As usual during the past few years, a number of foreigners, chiefly Germans, have occupied tables in the laboratory, having travelled from Europe expressly for the purpose of availing themselves of the facilities there afforded for original researches. This Report is recommended to botanists contemplating work in the tropics. W. B. H.

The Electric Light. Fifth Edition. By A. Bromley Holmes, M.Inst.C.E. (London: Bemrose and Sons, 1890.)

QUITE recently we had occasion to refer to the rapid growth that has taken place during the last few years in the development and application of electricity, and at the same time we gave an illustration of one of the latest forms of gas-engines for its production. This work places before the reader (who is assumed to be quite ignorant of electrical science) a popular and intelligent account "of the means used for producing electric light." The author, at the commencement, conscious of the difficulty of employing technical terms, explains each in simple language, so that their meanings may be fairly grasped by the reader.

After showing how electricity can be produced by batteries, he explains how it may be produced by mechanical means, leading up to the latest forms of dynamos. A very meagre description is given of these dynamos, descriptions of which, if they had been more fully treated, would have added great interest to this part of the work.

Conversion of electricity into light, and storage of electricity, are the subjects of the next two chapters, in the former of which are described the various lamps employed in lighting, with an account of the many self-adjusting arrangements for the purpose of keeping the carbon poles at a constant distance from each other. The remaining chapters deal with the distribution and measurement of electricity, testing and necessary precautions, and selection of light, in which the selection of lamp and the arrangements for any particular purposes are discussed. The author also treats of motive power and cost, concerning the latter of which he gives some interesting statistics relating to the comparison of gas and electricity.

On the whole, the author has produced an interesting book, which explains in a simple manner the elements of electric lighting.

Maps and Map-Drawing. By William A. Elderton. "Macmillan's Geographical Series." (London: Macmillan and Co., 1890.)

THIS little book will be found to form a most useful supplement to the works on geography published in the same series. In it an excellent brief account is given concerning the history of maps from the records of the Egyptians down to the present day. Then follow various methods of making surveys, including descriptions of the various instruments employed, such as the prismatic compass